Nanocomposites of foamed long chain branching polypropylene (LCB-PP) with carboxyl functionalized multiwall carbon nanotubes (MWCNT-COOH).

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Nanocomposites of foamed long chain branching polypropylene (LCB-PP) with carboxyl functionalized multiwall carbon nanotubes (MWCNT- COOH) were prepared by melt mixing and compression moulding. Azodicarbonamide (AZDC) was used as chemical foaming agent. The LCB-PP was kindly donated by Braskem, Brazil; the MWCNT was Nanocyl NC7000, from Belgium and the AZDC was kindly donated by Proquitec, Brazil. MWCNT-COOH were prepared by oxidation of pristine MWCNT with HNO_3 under reflux for 24h. To produce the foamed nanocomposites, the LCB-PP was mixed with 2.5 wt% of AZDC and 1.5, 3 and 5 wt% of MWCNT-COOH and MWCNT in a melt rheometer (HAAKE, 120 rpm, T=165°C) and subsequently foamed in a hot press. Scanning electron microscopy (SEM) was employed to study the dispersion of the nanotubes, functionalized and non-functionalized, and the morphology of the foamed nanocomposites. The linear viscoelastic behaviour of these nanocomposites were investigated. At low frequencies, *G'* became almost independent of the frequency as the loading increased, suggesting the onset of "solid" behaviour, indicating the rheological threshold. The electrical conductivity of these nanocomposites with functionalized and non-functionalized MWCNT were also investigated. As the load of nanotubes increased, the electrical conductivity became independent of the frequency, indicating that the electrical percolation threshold was reached. The nanocomposites with MWCNT-COOH had a lower electrical percolation threshold when compared with nanocomposites with non-functionalized MWCNT, indicating a better dispersion of nanotubes.